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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/562,371	07/21/2006	Peter John Hastwell	13004.5	6265

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EXAMINER	
MUMMERT, STEPHANIE KANE	

ART UNIT	PAPER NUMBER
1637	

MAIL DATE	DELIVERY MODE
12/23/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/562,371	HASTWELL ET AL.	
	Examiner	Art Unit	
	STEPHANIE K. MUMMERT	1637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 September 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 9, 2010 has been entered.

Applicant's amendment filed on September 9, 2010 is acknowledged and has been entered. Claims 1, 11-13 have been amended. Claims 15-20 has been added. Claims 1-20 are pending.

Claims 1-20 are discussed in this Office action.

Response to Arguments

Applicant's arguments, see p. 4-7, filed September 9, 2010, with respect to the rejection(s) of claim(s) under 35 U.S.C. 102 as being anticipated by McEntee have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Loewy.

All of the amendments and arguments have been thoroughly reviewed and considered but are not found persuasive for the reasons discussed below. Any rejection not reiterated in this

action has been withdrawn as being obviated by the amendment of the claims. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

This action is made NON-FINAL to address the New Ground of Rejection.

New Grounds of Rejection

Claim Interpretation

The term “dielectric layer” is not explicitly defined in the specification. In particular, the term is not explicitly claimed as distinct from the photoconductive layer. For example, the specification states "On the conductive layer **5** there is a dielectric layer **7** , the dielectric layer **7** is preferably a photoconductor, that is a layer of a material which can hold an electric charge and be discharged to the conductive layer **5** when light or other electromagnetic radiation impinges upon it” (paragraph 64). The specification also states, “The dielectric or photoconductive layer may be of a material which is adapted to have a charge pattern formed thereon on by selective discharging an already charged surface upon incident radiation impinging thereon” (paragraph 44). Therefore, the term is being given the broadest reasonable interpretation as reading on either an additional layer explicitly defined as a dielectric layer, or as interchangeable with a photoconducting layer, as recited in claim 8, for example, where the photoconducting layer is a dielectric layer.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-5, 7-9, 11-13, 15-20 are rejected under 35 U.S.C. 103(a) as being obvious over McEntee et al. (March 2004; 102(e) date September 13, 2002) in view of Loewy et al. (WO00/25936; May 2000). McEntee teaches formation of arrays through electrostatic guidance of ionic samples (Abstract).

With regard to claim 1, McEntee teaches a substrate adapted for selective micron and nanometer scale deposition, the substrate having; a support (p. 6-7, where the conductive and photoconductive layers are on the support, 110, see Figure 1); a conductive layer on the support (p. 6-7, where the conductive layer, 120, overlays the support); a dielectric layer of a material which will hold an electrostatic charge, the dielectric layer disposed on the conductive layer (p. 6-7, where the photoconductive layer, 130, overlays the conductive layer; p. 5, [43] where the support can be patterned through illumination with light and where the photoconductive layer is interpreted as interchangeable with the dielectric layer claimed, see claim interpretation); chemically functional layer, on the dielectric layer, the chemically functional layer providing a protective layer for the dielectric layer (p. 6, [47], [50], where the support "guides the ionized droplet of the material to preferentially deposit on an illuminated location or a non-illuminated location of the surface… due to electrostatic force" and "the deposited material chemically bonds to the photoconductive layer surface at the preferred location", therefore the photoconductive layer includes a chemical layer that provides a reactive surface for compounds deposited on the surface; [57], where the photoconductive layer is protected); whereby electrostatic charge patterns may be formed in a predetermined manner upon or in the substrate (p. 5, [43], where the

support, particularly the photoconductive layer, can be patterned with electric charge; p. 5, [41] where the support guides droplet placement on an array surface; p. 2, [14] where the deposition sites are present in an array or predetermined format on the substrate).

With regard to claim 2, McEntee teaches an embodiment of claim 1 wherein the support is selected from the group comprising a metal, glass, ceramic, or polymeric material and the support is clear or opaque and flexible or rigid (p. 4, [38] where the substrate can be of any suitable material, emits low fluorescence and is relatively transparent).

With regard to claim 3, McEntee teaches an embodiment of claim 1 wherein the conductive layer is combined with the support (p. 1 [10], p. 6-7, where the substrate includes an attached or combined conductive layer).

With regard to claim 4, McEntee teaches an embodiment of claim 1 wherein the conductive layer is a very thin layer and is transparent (p. 9, [72], where thin film fabrication is well known; p. 11, [83] where "the apparatus 200 can be manufactured using well-known optical transparent substrate materials and using optical transparent electrically conducting materials").

With regard to claim 5, McEntee teaches an embodiment of claim 1 wherein the conductive layer conductive layer is vacuum-deposited onto the support (p. 9, [72], where the substrate is coated using a variety of techniques for deposition including forming a thin film; and where it is noted that the claim is drawn to a product by process and absent a showing that the process of applying the conductive layer imposes a structural difference in the final product, any type of deposition which places the conductive layer on the substrate anticipates the claim).

With regard to claim 7, McEntee teaches an embodiment of claim 1 wherein the dielectric layer is selected from the group comprising a glass, a polymeric resin and a

methylmethacrylate (MMA) (p. 5, [43] where the dielectric layer is interpreted as interchangeable with photoconductor, and where the photoconductor includes amorphous silica, a type of glass or resin).

With regard to claim 8, McEntee teaches an embodiment of claim 1 wherein the dielectric layer is a photoconductor (p. 6-7, where the photoconductive layer, 130, overlays the conductive layer; p. 5, [43] where the support can be patterned through illumination with light and where the photoconductive layer is interpreted as interchangeable with the dielectric layer claimed, see claim interpretation).

With regard to claim 9, McEntee teaches an embodiment of claim 8 wherein the photoconductor is selected from the group comprising zinc oxide, cadmium sulphide, lead sulphide, lead selenide, amorphous selenium, doped selenium, alloys of selenium including selenium-tellurium, selenium-arsenic, organic photoconductive materials including polyvinylcarbazole (PVK) and complexes of polyvinylcarbazole sensitised with trinitrofluorenone (p. 5, [43] where the photoconductor includes zinc oxide and selenium).

With regard to claim 11, McEntee teaches a substrate having;

a support (p. 6-7, where the conductive and photoconductive layers are on the support, 110, see Figure 1); a conductive layer on the support (p. 6-7, where the conductive layer, 120, overlays the support); a photoconductive layer of a material which is adapted to have an electrostatic charge thereon selectively dissipated upon receiving incident radiation, the photoconductive layer disposed on the conductive layer (p. 6-7, where the photoconductive layer, 130, overlays the conductive layer; p. 5, [43] where the support can be patterned through illumination with light); and a chemically functional layer on the photoconductive layer, the chemically functional

layer providing a protective layer for the photoconductive layer (p. 6, [47], [50], where the support "guides the ionized droplet of the material to preferentially deposit on an illuminated location or a non-illuminated location of the surface… due to electrostatic force" and "the deposited material chemically bonds to the photoconductive layer surface at the preferred location", therefore the photoconductive layer includes a chemical layer that provides a reactive surface for compounds deposited on the surface; [57], where the photoconductive layer is protected);

whereby electrostatic charge patterns may be formed in a selected array upon the substrate to influence the movement of charged droplets in a liquid medium on the substrate (p. 5, [43], where the support, particularly the photoconductive layer, can be patterned with electric charge; p. 5, [41] where the support guides droplet placement on an array surface).

With regard to claim 12, McEntee teaches a substrate adapted for manufacture of DNA arrays, the substrate having:

a support (p. 6-7, where the conductive and photoconductive layers are on the support, 110, see Figure 1); a conductive layer on the support (p. 6-7, where the conductive layer, 120, overlays the support); a photoconductive layer of a material which is adapted to have an electrostatic charge thereon dissipated upon receiving incident radiation, the photoconductive layer disposed on the conductive layer (p. 6-7, where the photoconductive layer, 130, overlays the conductive layer; p. 5, [43] where the support can be patterned through illumination with light); and a chemically functional layer on the photoconductive layer, the chemically functional layer providing a protective layer for the photoconductive layer (p. 6, [47], [50], where the support "guides the ionized droplet of the material to preferentially deposit on an illuminated

location or a non-illuminated location of the surface… due to electrostatic force" and "the deposited material chemically bonds to the photoconductive layer surface at the preferred location", therefore the photoconductive layer includes a chemical layer that provides a reactive surface for compounds deposited on the surface; [57], where the photoconductive layer is protected); whereby electrostatic charge patterns may be formed in a selected array upon the substrate to influence the movement of charged droplets in a liquid medium on the substrate (p. 5, [43], where the support, particularly the photoconductive layer, can be patterned with electric charge; p. 5, [41] where the support guides droplet placement on an array surface); the chemically functional layer comprising at least in part a chemically active material to which a binder molecule can be attached, whereby a selected electric charge pattern may be generated upon the substrate by incident radiation to enable selective chemical de-protection of the binder molecules or DNA oligomers already joined to a binder molecule and application of nucleotides to selected binder molecules or to DNA oligomers already joined to a binder molecule (p. 5, [43], where the support, particularly the photoconductive layer, can be patterned with electric charge; p. 5, [41] where the support guides droplet placement on an array surface; p. 11, [84] where the array is used for binding DNA oligomers to the array).

With regard to claim 13, McEntee teaches a substrate adapted for manufacture of DNA arrays, the substrate having:

a support (p. 8, legend to Figure 5A, where the layers are on a support); a conductive layer on the support (p. 6-7, where the conductive layer, 120, overlays the support); a photoconductive layer of a material which is adapted to have an electrostatic charge thereon selectively dissipated upon receiving incident radiation, the photoconductive layer disposed on

the conductive layer (p. 6-7, where the photoconductive layer, 130, overlays the conductive layer; p. 5, [43] where the support can be patterned through illumination with light); and a chemically functional layer on the photoconductive layer, the chemically functional layer providing a protective layer for the photoconductive layer (p. 6, [47], [50], where the support “guides the ionized droplet of the material to preferentially deposit on an illuminated location or a non-illuminated location of the surface… due to electrostatic force” and “the deposited material chemically bonds to the photoconductive layer surface at the preferred location”, therefore the photoconductive layer includes a chemical layer that provides a reactive surface for compounds deposited on the surface; [57], where the photoconductive layer is protected);

whereby electric charge patterns may be formed in a selected array upon the substrate to influence the movement of charged droplets in a liquid medium on the substrate (p. 5, [43], where the support, particularly the photoconductive layer, can be patterned with electric charge; p. 5, [41] where the support guides droplet placement on an array surface).

Regarding claim 1, 11-13, McEntee does not specifically teach a continuous chemical layer and a chemically reactive surface for compounds deposited on the surface.

With regard to claim 1 and 11-13 Loewy teaches a continuous chemically functional layer, the chemically functional layer providing a protective layer for the dielectric layer and a chemically reactive surface for compounds deposited on the surface (p. 2, lines 1-13, where the chemical component or layer can include a continuous layer and include a reactive surface for attachment of biomolecules; p. 9, lines 24-25, where the layer of a chemical component can be continuous; see also Figure 1);

With regard to claim 15, Loewy teaches an embodiment of claim 1, wherein the continuous chemically functional layer is disposed on substantially the entire dielectric layer (p. 2, lines 1-13, where the chemical component or layer can include a continuous layer and include a reactive surface for attachment of biomolecules; see also Figure 1 and p. 9).

With regard to claim 16, Loewy teaches an embodiment of claim 1, wherein the continuous chemically functional layer is a mono-molecular film (p. 3, lines 23-31, where the layers of the support can be coated or applied as a monolayer; see also Figure 1 and p. 9).

With regard to claim 17, Loewy teaches an embodiment of claim 11, wherein the continuous chemically functional layer is disposed on substantially the entire photoconductive layer (p. 2, lines 1-13, where the chemical component or layer can include a continuous layer and include a reactive surface for attachment of biomolecules; see also Figure 1 and p. 9).

With regard to claim 18, Loewy teaches an embodiment of claim 11 wherein the continuous chemically functional layer is a mono-molecular film (p. 3, lines 23-31, where the layers of the support can be coated or applied as a monolayer).

With regard to claim 19, Loewy teaches an embodiment of claim 12, wherein the continuous chemically functional layer is disposed on substantially the entire photoconductive layer (p. 2, lines 1-13, where the chemical component or layer can include a continuous layer and include a reactive surface for attachment of biomolecules; see also Figure 1 and p. 9).

With regard to claim 20, Loewy teaches an embodiment of claim 13 wherein the continuous chemically functional layer is a mono-molecular film (p. 3, lines 23-31, where the layers of the support can be coated or applied as a monolayer; see also Figure 1 and p. 9).

It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to have extended the teachings of McEntee to include the continuous layer of chemical elements as taught by Loewy to arrive at the claimed invention with a reasonable expectation for success. As taught by Loewy, "Chemical components can be applied in submonolayer, monolayer or multilayer levels on the substrate particles. Multilayer level application of chemical components on substrate particles (or beads) can include coating the substrate with an observable quantity of the chemical component. The chemical component (s) can also be a bioactive agent that is a nutrient or an antimicrobial agent." (p. 3, lines 23-31). Loewy teaches both discontinuous and continuous chemical layers and the benefits of both. Therefore, one of skill would recognize the flexibility of exploring both options in substrate design. Therefore, one of ordinary skill in the art at the time the invention was made would have been motivated to have extended the teachings of McEntee to include the continuous layer of chemical elements as taught by Loewy to arrive at the claimed invention with a reasonable expectation for success.

Claims 6 and 10 are rejected under 35 U.S.C. 103(a) as being obvious over McEntee et al. (March 2004; 102(e) date September 13, 2002) in view of Loewy et al. (WO00/25936; May 2000) as applied to claims 1-5, 7-9, 11-13, 15-20 and further in view of (Salafsky et al. (US PgPub 2002/0094528 July 2002 102(e) date 11/29/00). McEntee teaches formation of arrays through electrostatic guidance of ionic samples (Abstract).

McEntee and Loewy render obvious all of the limitations of claims 1-5, 7-9, 11-13, 15-20. However, McEntee does not specifically teach the conductive layer and components of the

chemical layer as claimed below. Salafsky teaches the formation of surface arrays which are used to detect probe and target interactions (Abstract).

With regard to claim 6, Salafsky teaches an embodiment of claim 1 wherein the conductive layer is selected from the group comprising a sputtered layer of metal or indium tin oxide, or a carbon nano-tube layer (paragraph 39, where the array comprises indium tin oxide).

With regard to claim 10, Salafsky teaches an embodiment of claim 1 wherein the chemically functional layer is a material selected from the group comprising a silane polymer, silicon dioxide, silicon nitride (SixNy), titanium dioxide, Tyzor TM, cross-linked or partially cross-linked epoxy novolac resins, polymerised oligomers, cross-linked resins, functionalised parylene (a polymer of di-para-xylyene), acrylates and methacrylates which may include functional groups, multi-functional acrylates and methacrylates, monomers which have been crosslinked with a photoinitiator (paragraph 166, where a chemical layer provides functional layers on a surface which can be modified or adjusted for interaction with chemical interactions and where silica beads are covered by silanol groups as claimed).

It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to have adjusted the teachings of McEntee to include the specific conductive layer and chemical layer elements as taught and suggested by Salafsky to arrive at the claimed invention with a reasonable expectation for success. Regarding the conductive layer, as taught by Salafsky, "The surface arrays can be constructed according a plurality of methods found in the art. For DNA microarrays, most are prepared with one of three non-standard approaches" (paragraph 38). Salafsky also teaches "The array substrate can be composed of glass, silicon, indium tin oxide, or any other substrate known in the art" (paragraph 39). Regarding the

chemical layer element, Salafsky teaches, “a chemical layer which functionally derivatizes the surface of a solid support. For instance, the surface chemical groups can be changed by the derivatization layer according to the particular chemical functionality of the derivatizing agent” (paragraph 166). Salafsky also notes "a silica bead with negatively charged silanol groups on its surface can be converted to an amine-reactive, amine-containing, etc. surface via organosilane reagents” (paragraph 166). Therefore, one of ordinary skill in the art at the time the invention was made would have been motivated to have adjusted the teachings of McEntee to include the specific conductive layer and chemical layer elements as taught and suggested by Salafsky to arrive at the claimed invention with a reasonable expectation for success.

Response to Arguments

Applicant's arguments with respect to claims 1-13 have been considered but are moot in view of the new ground(s) of rejection.

Relevant Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Mozorov et al. (US Patent 6,350,609) teaches array fabrication in the form of spots (Abstract). Loewy et al. (WO00/25936; May 2000) teaches a method for controlled electrostatic deposition of particles onto a substrate.

Conclusion

No claims are allowed. All claims stand rejected.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to STEPHANIE K. MUMMERT whose telephone number is (571)272-8503. The examiner can normally be reached on M-F, 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on 571-272-0782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Stephanie K. Mummert/
Primary Examiner, Art Unit 1637

SKM